

Remarks

Claims 1 and 9 have been amended. No new matter has been added by way of these amendments. Applicants seek to place the claims in more suitable condition for US prosecution.

Objections under 35 U.S.C 102(b)

Neither of the citations relied on by the examiner, i.e. Reynolds (US 4 008 608) or Warner (EP 0 657 622), disclose the arrangement claimed in independent claims 1 and 9.

Reynolds is concerned with a different purpose, i.e. predicting the geothermal gradient (temperatures) of a formation (see col. 1 lines 7 and 22 for example). Reynolds teaches this is achieved because there is a relationship between geothermal gradient and the velocity changes with depth into a formation (see col. 2 lines 16-18). Thus, sound waves are injected through the formation to determine the changes in velocity wave propagation through the formation.

However, Reynolds is concerned with measuring the velocity in the formation (see col. 3 line 2), which is wholly different from the present application in that the preamble of both claims 1 and 9 clearly recites "*for determining a velocity of ultrasound propagation in a drilling fluid*". Paragraph [0002] of the present application establishes this distinctive context in describing that borehole dimensions may be determined using ultrasound measurements that rely on knowledge of the ultrasound pulse in drilling fluids.

Thus, the present application is concerned with determining the velocity propagating in the drilling fluid of the borehole, whereas Reynolds is concerned with determining the velocity propagating through the rock strata making up the surrounding formation.

The examiner also relies on Warner, but the passages relied on in the Office Action do not appear to be correct in that the examiner refers to lines 60-67 of col. 1, but the published format only appears to have 58 lines in each column.

In any event, Warner teaches away from the concept of using multiple acoustic devices for determining a distance. Col. 3 lines 18-20 describes how multiples devices significantly increase the cost of the overall system. Instead, Warner teaches a single ultrasonic transducer 34 (see Col. 3 lines 40-42 and Figure 1). Thus both claims 1 and 9 are distinguished over Warner in reciting “*a first ... and a second ultrasound transducer*”.

Claims 1 and 9 are further distinguished over Reynolds and Warner in reciting the structural relationship between these first and second ultrasound transducers in that “*a front face of the first transducer is offset from a front face of the second ultrasound transducer by a predetermined radial offset distance (ΔDf)*”.

In Warner, the radial difference (R2-R1) is the distance between the drill collar and borehole wall (see also col. 8 lines 24-26 and Figure 1), but is not a distance between respective faces of first and second transducers as claimed. Claim 9, directed at the apparatus of the present application, emphasizes the distinction by reciting “*the first and second ultrasound transducers being located on the tool*”.

In Reynolds, col.3 line 45 mentions a fixed distance between receiver devices, but there is no disclosure of a radial offset distance and, more importantly, no mention of the alignment of respective faces of the first and second transducers as claimed. Claim 1 has been further amended to emphasize the distinction over Reynolds in reciting “*determining a travel time (t) for the ultrasound pulse to travel the distance (d)*” wherein this distance (d) is defined in the previous step as being through the “drilling fluid”. There is no such disclosure in Reynolds, since it is not concerned with determining ultrasonic travel times through a drilling fluid.

The Applicants believe the claims are in condition for allowance, and early passage to issuance is requested. The Commissioner is authorized to charge any fee associated with the submission of this response to Deposit Account No. 50-2183 (Ref. No. 21,1066).

The Examiner is invited to contact the undersigned patent attorney at 281.285.6493 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



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